

DRAFT
ENGINEERING EVALUATION
Van Acker Construction Associates, Inc.
PLANT NO. 16453
APPLICATION NO. 10788

BACKGROUND

Van Acker Construction Associates, Inc. of Mill Valley, California is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

**S-1 Standby Generator Set: Diesel Engine; Make: Cummins; Model: 4BTA3.9-G5;
 Rated Horsepower: 99 HP**

The standby generator set will be located at 2940 Pacific Avenue, San Francisco, California 94115. This genset will provide emergency power in the event of a blackout for emergency lights, elevators, etc for the building at the above location. This engine must be periodically tested to ensure that it will generate when needed. Testing or maintenance may not be conducted between 7:30 AM and 3:30 PM on days when schools are in session.

EMISSIONS SUMMARY

Annual Emissions:

The CARB certified emission factors for S-1 (99 HP- diesel engine) are listed below:

Pollutant	Emission Factors (g/hp-hr)
	<i>S-1</i>
NO _x	5.07
CO	0.37
POC	0.25
PM10	0.15
SO ₂ *	0.184*

**The emission factor for SO₂ is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*

$SO_2 \quad 8.09E-3 \text{ (\% S in fuel oil) lb/hp-hr} = 8.09E-3 (0.05\% S) (454 \text{ g/lb}) = 0.184 \text{ g/hp-hr}$

NO_x = (5.07 g/hp-hr) (99 hp) (50 hr/yr) (lb/454g) = 55.5 lb/yr = 0.03 TPY
 CO = (0.37 g/hp-hr) (99 hp) (50 hr/yr) (lb/454g) = 4.07 lb/yr = 0.002 TPY
 POC = (0.25 g/hp-hr) (99 hp) (50 hr/yr) (lb/454g) = 2.77 lb/yr = 0.0015 TPY
 PM₁₀ = (0.15 g/hp-hr) (99 hp) (50 hr/yr) (lb/454g) = 1.63 lb/yr = 0.001 TPY
 SO₂ = (0.184 g/hp-hr) (99 hp) (50 hr/yr) (lb/454g) = 2.01 lb/yr = 0.001 TPY

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

For S-1:

NO_x = (5.07 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 26.5 lb/day
 CO = (0.37 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 1.95 lb/day
 POC = (0.25 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 1.33 lb/day
 PM₁₀ = (0.15 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 0.78 lb/day
 SO₂ = (0.184 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 0.96 lb/day

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New	Total
NO _x	0	0.03	0.03
CO	0	0.002	0.002
POC	0	0.0015	0.0015
PM ₁₀	0	0.001	0.001
SO ₂	0	0.001	0.001
NPOC	0	0	0

Toxic Risk Screening:

The toxic emission of diesel particulate exceeds the District Risk Screening Trigger, as shown in Table (1) below, and a Risk Screening Analysis has been performed.

Table 1. Calculated incremental increase in diesel exhaust particulate matter for S-1

Source:	PM ₁₀ Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year) ¹	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.15	99	50	1.63	0.64	Yes

¹ Annual Usage based on 100 hours per year of operation for reliability-related activities as defined in Regulation 9-8-330 ("Emergency Standby Engines, Hours of Operations").

Per the attached 12/22/04 memo from Irma Salinas, results from the health risk screening analysis indicate that the incremental cancer risk for the maximally exposed on-site students is 3.85 in a million for 50 hours of operation per year, excluding periods when operation is required due to emergency conditions. Under those same conditions, the maximum incremental cancer risk for the nearest residential receptor is 3.85 in a million, and the maximum incremental cancer risk for an off-site worker is 2.54 in a million. Thus, in accordance with the District's Toxic Risk Management Policy, the project meets the District's standard of 10 in a million.

The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations. Stack and building parameters for the analysis were based on information provided by the applicant. Estimates of residential risk assume continuous 70-year exposure to annual average TAC concentrations. Off-site workers estimates assume exposure occurs for 46 years out of a 70-year lifetime. The off-site worker adjustment factor is:

$(46 \text{ years} / 70 \text{ years}) = 0.657 * \text{residential risk}$

Estimates of risk to students assume exposure occurs at a higher breathing rate of 581 L/kg-day compared to 286 L/kg-day for residents during 180 school days per year out of 261 weekdays per year and for 9 years out of a 70-year lifetime. The student adjustment factor is:

$(581 \text{ L/kg-day} / 286 \text{ L/kg-day}) / (180 \text{ days} / 261 \text{ days}) * (9 \text{ years} / 70 \text{ years}) = 0.180 * \text{residential risk}$

PUBLIC COMMENT

The project is within 1000 feet of the site of a large school and therefore subject to the public notification requirements of Reg. 2-1-412. Expanding the search radius to 0.25 miles reveals the nearby presence of five schools: San Francisco University High School, San Francisco Waldorf School, Town School For Boys, Hillwood Academic Day School, and Cow Hollow Kindergarten. The public notice will be posted on the Internet and mailed to all Parents or Guardians with children enrolled at the aforementioned schools. It will also be mailed to all residential neighbors located within 1000 feet of the proposed new source of pollution.

At-school and near school provisions. No owner or operator shall operate an in-use stationary emergency standby diesel-fueled compression Ignition engine for non-emergency use, including maintenance and testing, during the following periods: a) whenever there is a school sponsored activity, if the engine is located on school grounds, and b) between 7:30 a.m. and 3:30 p.m. on days when school is in session, if the engine is located within 500 feet of school grounds.

STATEMENT OF COMPLIANCE

The owner/operator of S-1 shall comply with Reg. 6 (Particulate Matter and Visible Emissions Standards) and Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). Since this engine meets TBACT for PM10 ($<0.15 \text{ g/hp-hr}$), it is expected to comply with Reg. 6. Low sulfur diesel (0.05wt%) will be used to meet the sulfur limitation of 0.5wt% in Reg. 9-1-304. Because S-1 is an emergency standby generator, Reg. 9-8-110 (Inorganic Gaseous Pollutants: Nitrogen Oxides from Stationary Internal Combustion Engine) exempts the requirements for emission limits of

Sections 9-8-301, 302, and 502. Allowable operating hours and the corresponding record keeping in Reg. 9-8-330 and 530 will be included in the Permit Conditions below.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3)

Best Available Control Technology:

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NO_x, CO, SO₂ or PM₁₀.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutant: NO_x. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to meet BACT 2 limits presented below.

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
NO _x	1. 1.5 g/bhp-hr [107 ppmvd @ 15% O ₂] ^{a,b} 2. 6.9 g/bhp-hr [490 ppmvd @ 15% O ₂] ^{a,b,c} 3. 6.9 g/bhp-hr [490 ppmvd @ 15 % O ₂]	1. Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler ^{a,b} 2. Timing Retard $\leq 4^{\circ}$ + Turbocharger w/ Intercooler ^{a,b,c} 3. Timing Retard $\leq 4^{\circ}$ + Turbocharger w/ Intercooler

The NO_x emission limit set by BACT 2 is met, as shown in Table (2) on the next page.

Table (2)

Pollutant	Engine Emission Factors (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
NO _x	5.07	6.9	YES

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 15 tons/yr of POC or NO_x. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Conditions for S-1 Stationary Standby Generator

Application #10788, Plant #16453, Van Acker Construction Associates, Inc.:

PC

1. Hours of Operation: The owner/operator shall operate the emergency standby engine(s) only to mitigate emergency conditions or for reliability-related activities. Operating while mitigating emergency conditions is unlimited. Operating for reliability-related activities is limited to 50 hours per any calendar year.
[Basis: Regulation 9-8-330]

"Emergency Conditions" is defined as any of the following:

- a. Loss of regular natural gas supply.
- b. Failure of regular electric power supply.
- c. Flood mitigation.
- d. Sewage overflow mitigation.
- e. Fire.
- f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.

[Basis: Regulation 9-8-231]

"Reliability-related activities" is defined as any of the following:

- a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
- b. Operation of an emergency standby engine during maintenance of a primary motor.

[Basis: Regulation 9-8-232]

2. The owner/operator shall equip the emergency standby engine(s) with either:
 - a. a non-resettable totalizing meter that measures the hours of operation for the engine; or
 - b. a non-resettable fuel usage meter, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.
[Basis: Regulation 9-8-530]

3. The owner or operator shall not operate S-1, stationary emergency standby diesel-fueled CI engine for non-emergency use, including maintenance and testing, during the following periods:
 - a. whenever there is a school sponsored activity, if the engine is located on school grounds, and
 - b. between 7:30 a.m. and 3:30 p.m. on days when school is in session, if the engine is located within 500 feet of school grounds.

4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 2 years and shall make the log available for District inspection upon request:
 - a. Hours of operation (total).
 - b. Hours of operation (emergency).
 - c. For each emergency, the nature of the emergency condition.
 - d. Fuel usage for engine(s) if a non-resettable fuel usage meter is utilized.[Basis: Regulations 9-8-530 and 1-441]

RECOMMENDATION

Issue an Authority to Construct to Van Acker Construction Associates, Inc. for:

**S-1 Standby Generator: Diesel Engine; Make: Cummins; Model: 4BTA3.9-G5;
Rated Horsepower: 99 HP**

EXEMPTIONS

None.

By: _____

Roy Lo
Air Quality Engineering Intern

Date: _____